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EUROPEAN PATENT APPLICATION

⑰ Application number : **91300983.3**

⑤① Int. Cl.⁵ : **B65D 81/32, B65D 83/00**

⑳ Date of filing : **06.02.91**

③① Priority : **08.02.90 JP 27150/90**

④③ Date of publication of application :
21.08.91 Bulletin 91/34

⑥④ Designated Contracting States :
DE FR GB IT

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⑤④ **Plastics packaging of volatile substance.**

⑤⑦ An inner bag is made of a thermoplastic film consisting essentially of poly(acrylonitrile), e.g. 20 to 30 μ thick, and a volatile substance to be stored, e.g. a perfume or preservative, is placed therein in liquid form; the bag is heat-sealed and placed in an outer bag made of gas-permeable material, e.g. polyethylene laminated to paper.

The inner bag has high gas-barrier properties and keeps the volatile substance from escaping during storage, but it is easily ruptured by the fingers by a force of 300 to 800 g/15 mm.

EP 0 442 659 A1

PLASTICS PACKAGING OF VOLATILE SUBSTANCE

The present invention relates to a package releasably containing a volatile substance.

Volatile substances to be volatilized when desired have heretofore been hermetically packed and stored in bags or containers through which the volatile substances cannot permeate. When desired, such bags or containers are opened to allow volatile substances to escape therefrom. However, this type of packaging is liable to allow a liquid volatile substance to leak, in particular at the time of opening a bag or a container and/or during use thereof and therefore to pose a threat of contaminating therewith hands, clothes, etc., and involves the disadvantage of a complicated operation for allowing the volatile substance to escape.

A package packed with an aromatic substance, which is an improvement over the foregoing type, is disclosed in Japanese Utility Model Laid-Open No. 48,246/1983. The inner bag of this package is constituted of an innermost heat-sealing film, an interlayer gas-barrier film and a protective surface film. The inner bag packed with the aromatic, which is a volatile substance, is sealed at the sealing area of its open end portion with such a strength as to allow the sealed area of the end portion to be easily peeled open and the bag to rupture when the bag packed with the aromatic is strongly compressed. The inner bag is hermetically packed in an outer bag or container comprising a gas-permeable film at least in part. This package packed with the aromatic is capable of spreading the gas of the aromatic through the gas-permeable film toward the outside of the package in use, after the inner bag is ruptured by peeling open the sealed area thereof. The outer bag or container keeps the aromatic, particularly a liquid aromatic, from leaking out of the package to avoid contamination of other articles with the aromatic which would otherwise have leaked out of the package. Since the outer peripheral end of the inner bag is constituted of the cross sections of the films including the innermost heat-sealing film devoid of gas-barrier properties, however, the aromatic vapor escapes from said outer peripheral end through the innermost heat-sealing film even during storage of the package. Thus, this package has the defect of poor keeping quality.

An object of the present invention is to provide a package of a construction similar to that of the aforedescribed package, which is packed with a volatile substance such as a perfume, a deodorant, an insecticide, a mothball, a germicide, a mildewcide, a vermin repellent, or a rust-proofing agent, and which can keep the volatile substance from escaping therefrom during storage thereof but allow when desired the volatile substance to easily escape from the outer bag thereof toward the outside of the package.

We have found that the use of an acrylonitrile-type of thermoplastic resin film as a material of an inner bag wherein a volatile substance is contained can sufficiently keep the volatile substance from escaping during storage and permit the inner bag to be easily ruptured by application thereto of an external pressure with fingers.

Thus, in accordance with the present invention, there is provided a package comprising an inner bag made substantially of a poly(acrylonitrile) thermoplastic film and having a volatile substance hermetically sealed therein, and an outer bag made of a gas-permeable film and having the inner bag packed therein.

polyester, polyamide, vinylidene chloride and like resins are known as having good gas-barrier properties. Where films of these resins having a thickness of 20 to 30 μ generally best adapted for bag making are used to make inner bags, however, a force (peel force) of at least 2 kg/15mm as an external pressure must be applied to the inner bags in order to cause rupture of the inner bags. Accordingly, it is next to impossible to cause rupture of the inner bags with the fingers. By contrast, an inner bag made of an acrylonitrile-type thermoplastic resin film, when pressed, undergoes rupture not through peeling open of the sealed area thereof but through breaking of the border area thereof between the bonded and non-bonded areas thereof. This enables the inner bag to be ruptured by a force of 300 to 800 g/15mm. In this case, substantially the same level of force can cause rupture of the inner bag irrespective of whether the film thickness thereof is around 20 μ or around 30 μ .

The poly(acrylonitrile) may contain a small portion of comonomer units or other blended polymers.

The outer bag must be adapted for permeation by the volatile substance.

The inner bag may be formed either of a single layer of the acrylonitrile-type thermoplastic resin film, or of a two-layer film having a layer of the acrylonitrile-type thermoplastic resin film and a layer of an easy-to-rupture aluminum foil laminated on the layer of the acrylonitrile-type thermoplastic resin film, though a choice of the layer structure may depend on the bag-making process (method of bonding).

The inner bag has high gas-barrier properties and good heat-sealing properties to satisfactorily keep a volatile substance from escaping during storage thereof. A simple operation of application of an external pressure only with fingers causes the inner bag to be ruptured, with the result that the volatile substance is allowed to escape to be used.

The following Examples will now illustrate the present invention in more detail.

Example 1

A 20 μ -thick acrylonitrile-type thermoplastic resin film (trade name : Zexlon, manufactured by Mitsui Toatsu Chemicals, Inc.) was used to make a bag having an internal size of 15 mm x 20 mm through fusion bonding. 0.6 g of a liquid perfume was placed in the bag, which was then hermetically heat-sealed. This bag as an inner bag was packed and hermetically sealed in an outer bag having an internal size of 30 mm x 30 mm and made of a polyethylene-laminated viscose paper (trade name : Saflon, manufactured by Fukui Chemical Co., Ltd) to form a package packed with the perfume.

When the package was pressed from outside, the inner bag underwent rupture with a force of 400 g/15 mm.

Example 2

A 20 μ -thick Zexlon film was used to make a bag having an internal size of 25 mm to 30 mm through fusion bonding. 2 cc of limonene was placed in the bag, which was then hermetically heat-sealed. This bag was packed and hermetically sealed in a bag made of Saflon paper and having an internal size of 35 mm x 40 mm. The resulting package packed with limonene underwent rupture of the inner bag with a force of 380 g/15 mm.

Example 3

A 30 μ -thick Zexlon film was used to make a bag having an internal size of 30 mm x 35 mm through fusion bonding. 3 g of a mixture of 30 wt. % of a liquid perfume and 70 wt. % of odorless kerosine was placed in the bag, which was then hermetically heat-sealed. This bag was packed and hermetically sealed in a bag made of Saflon paper and having an internal size of 40 mm x 45 mm. The resulting package packed with the mixture underwent rupture of the inner bag with a force of 450 g/15 mm.

Example 4

A 30 μ -thick Zexlon film was used to make a bag having an internal size of 25 mm x 30 mm through fusion bonding. 2 ml of 20 wt. % aqueous formalin was placed in the bag, which was then hermetically heat-sealed. This bag was packed and hermetically sealed in a bag made of Saflon paper and having an internal size of 35 mm x 40 mm. The resulting package packed with formalin underwent rupture of the inner bag with a force of 380 g/15 mm.

Example 5

A laminated film of a 20 μ -thick Zexlon film having

a 6 μ -thick aluminum foil laminated thereon was used to make a bag having an internal size of 50 mm x 50 mm through fusion bonding. 5 g of ethanol was placed in the bag, which was then hermetically heat-sealed. This bag was packed and hermetically sealed in a bag made of Saflon paper and having an internal size of 60 mm x 70 mm. The resulting package packed with ethanol underwent rupture of the inner bag with a force of 550 g/15 mm.

Example 6

A laminated film of a 30 μ -thick Zexlon film having a 10 μ -thick aluminum foil laminated thereon was used to make a bag having an internal size of 25 mm x 30 mm through fusion bonding. 2 g of water was placed in the bag, which was then hermetically heat-sealed. This bag was packed and hermetically sealed in a bag made of Saflon paper and having an internal size of 35 mm x 40 mm. The resulting package packed with water underwent rupture of the inner bag with a force of 600 g/15 mm.

Example 6 illustrates the use of the invention for packaging of water, which although of low volatility can be used as a solvent or vehicle for a more volatile substance such as a germicide (not specified in this Example).

Claims

1. A package comprising an inner bag consisting substantially of poly (acrylonitrile) thermoplastic film and having a volatile substance hermetically sealed therein, and an outer bag made of a gas-permeable film and having said inner bag packed therein.
2. A package as claimed in Claim 1, wherein the outer bag comprises polyethylene.
3. A package as claimed in Claim 1 or 2, wherein the inner bag includes a layer of aluminum foil laminated to the acrylonitrile film.
4. A package as claimed in Claim 1, 2 or 3, which contains a perfume, deodorant, insecticide, mothball, germicide, mildewcide, repellent or rust-proofing agent.



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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 0983

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	FR-A-2 492 776 (JOH. A. BENCKISER GmbH) * Figure 1; page 2, lines 12-34; page 3, line 37 - page 4, line 5; page 5, line 34 - page 6, line 8 *	1-4	B 65 D 81/32 B 65 D 83/00
A	FR-A-2 345 363 (A. DEBARD et al.) * Figures 1,3,5; page 1, lines 1-9,19-31; page 2, lines 24-41 *	1-4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13-05-1991	Examiner PERNICE, C.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>..... & : member of the same patent family, corresponding document</p>			

EPO FORM 1500 6/12 (P0981)